5

WHAT IS CLAIMED IS:

1. A photoresist with an adjustable polarized light response suitable for use in a photolithography process, the photoresist comprising a photosensitive polymer, wherein:

the photosensitive polymer absorbs an exposure light source to generate an optical reaction in the photolithography process;

the photosensitive polymer is oriented to a specific direction by a physical method; and

the photosensitive polymer has a response to a polarized light, wherein the response varies as an angle between the specific direction and a polarization direction of the polarized light changes.

- 2. The photoresist according to claim 1, wherein the linear photosensitive polymer includes a linear photosensitive polymer.
- 3. The photoresist according to claim 2, wherein when a direction of the linear photosensitive polymer is parallel to the polarization direction of the polarized light, the liner photosensitive polymer has a maximum polarized light response, and when the direction of the linear photosensitive polymer is perpendicular to the polarization direction of the polarized light, the liner photosensitive polymer has a minimum polarized light response.
- 4. The photoresist according to claim 2, wherein the linear photosensitive polymer comprises a photosensitive section and an anti-etching section.

15

20

- 5. The photoresist according to claim 4, wherein the photosensitive section includes a PMDA.
- 6. The photoresist according to claim 4, wherein the photosensitive section has a
 5 molecule weight of 10²~10⁸.
 - 7. The photoresist according to claim 4, wherein the anti-etching section includes ODA.
 - 8. The photoresist according to claim 4, wherein the photosensitive section has a molecule weight as $10^2 \sim 10^8$.
 - 9. The photoresist according to claim 1, wherein the physical method includes applying an electric field when the photosensitive polymer has electric dipoles.
 - 10. The photoresist according to claim 9, wherein applying an electric field includes using a plasma.
 - 11. The photoresist according to claim 9, wherein applying an electric field includes using a polarized ultra-violet light.
 - 12. The photoresist according to claim 9, wherein applying an electric field includes using a microwave.

15

20

- 13. The photoresist according to claim 1, wherein the physical method includes applying a magnetic field when the photosensitive polymer has magnetic dipoles.
- 14. The photoresist according to claim 9, wherein applying a magnetic field includes using a plasma.
 - 15. A photolithography process applying to a substrate, comprising:

providing a photoresist layer that includes a photosensitive polymer, which absorbs an exposure light source to generate an optical reaction, and is oriented to a specific direction by a physical method, a specific direction being variable as an angle between the specific direction and a polarization direction of a polarized light changes;

providing the exposure light source with a P-polarized light and an S-polarized light perpendicular to each other, the P-polarized light having a transmission coefficient larger than that of the S-polarized light;

forming the photoresist layer on the substrate of which the specific direction of the photosensitive polymer has a response to the P-polarized light smaller than a response to the S-polarized light to compensate for the difference of transmission coefficients, such that the optical reaction amount of the P-polarized light is about the same of the optical reaction amount;

using the exposure light source and a photomask to expose the photoresist layer;

developing the photoresist layer.

16. The photolithography process according to claim 15, wherein the

15

20

5

photosensitive polymer comprises a linear photosensitive polymer.

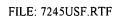
- 17. The photolithography process according to claim 16, wherein when a direction of the linear photosensitive polymer is parallel to the polarization direction of the polarized light, the liner photosensitive polymer has a maximum response to the polarized light, and when the direction of the linear photosensitive polymer is perpendicular to the polarization direction of the polarized light, the liner photosensitive polymer has a minimum response to the polarized light.
- 18. The photolithography process according to claim 16, wherein the linear photosensitive polymer comprises a photosensitive section and an anti-etching section.
- 19. The photolithography process according to claim 18, wherein the photosensitive section includes a PMDA.
- 20. The photolithography process according to claim 18, wherein the photosensitive section has a molecule weight as $10^2 \sim 10^8$.
- 21. The photolithography process according to claim 18, wherein the anti-etching section includes ODA.
- 22. The photolithography process according to claim 18, wherein the photosensitive section has a molecule weight as $10^2 \sim 10^8$.

10

15

20

- 23. The photolithography process according to claim 15, wherein the physical method includes applying an electric field when the photosensitive polymer has electric dipoles.
- 24. The photolithography process according to claim 23, wherein applying an electric field includes using a plasma.
- 25. The photoresist according to claim 23, wherein applying an electric field includes using a polarized ultra-violet light.
- 26. The photoresist according to claim 23, wherein applying an electric field includes using a microwave.
- 27. The photolithography process according to claim 15, wherein the physical method includes applying a magnetic field when the photosensitive polymer has magnetic dipoles.
- 28. The photolithography process according to claim 27, wherein applying a magnetic field includes using a plasma.
- 29. The photolithography process according to claim 15, wherein forming the photoresist layer on the substrate includes a step of spin coating.
 - 30. The photolithography process according to claim 15, wherein forming the



photoresist layer on the substrate includes vapor deposition.